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SENS Recommendation for Battery Chargers For Level 1 (Emergency) Duty Chargers As Defined By NFPA-110

NFPA-110 is a standard published by the National Fire Protection Association. Its scope is emergency and standby generator sets, including batteries and chargers used to start the generator set. Attention to the starting system is highly relevant because, according to Caterpillar, "The greatest cause of inoperable standby generator sets is lack of maintenance - usually discharged or dry batteries."

What is the NFPA-110 speed of recharging requirement?
NFPA-110:2002, paragraph 5.6.4.7(2) states that *"the charger shall be capable of returning to the fully discharged battery 100 percent of its ampere-hour rating within the time specified"*. This time is specified in NFPA-110 Table 5.6.4.2 as 24-hours for "Level 1" (emergency duty) gensets.

Will the UL inspector approve my charger and battery for Level 1 service?
The NFPA-110 recharge requirement is causing considerable industry and customer confusion about what charger to use on emergency duty gensets. The question boils down to, "how do I prove to the UL inspector's satisfaction that the charger will perform the required recharge with the battery used in my genset?"

Since the local UL inspector is unlikely to accept the word of the genset company or the charger manufacturer, UL has designed a method of proving that a charger will indeed meet the charging performance requirements of NFPA-110.

How can I get my genset to pass the local UL inspector?
The basic standard for chargers used in engine-start applications is UL 1236. The table below, however, shows some very important differences between common *UL categories* of the 1236 standard. Descriptions under "applicable duty" come direct from UL.

UL category	**Intended application and relevant other standards**
BBHH	Battery Chargers for Engine Driven Emergency and Standby Power System Generators. The basic standard used to investigate products in this category is UL 1236 and the applicable requirements of NFPA 110, "Standard for Emergency and Standby Power Systems."
BBGQ	Battery Chargers, Automotive Type

BBHH is clearly the correct category for use with emergency and standby generators
Based on UL's definitions, the category of charger intended for use on generator sets is clearly BBHH. It is also the only category that specifically addresses the recharge requirements of NFPA-110.

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Aren't all UL 1236 chargers listed under category BBHH?
Actually, very few are. Although there are many chargers listed to UL 1236, almost all are approved only for "automotive" type applications. BBHH is the *only* UL category to address the recharge requirements of NFPA-110.

What's the difference between BBHH and BBGQ chargers?
UL investigates only fire and personnel safety of BBGQ chargers. UL does not evaluate whether BBGQ chargers can actually recharge a battery! In contrast, the recharge performance of BBHH chargers is thoroughly tested. A comprehensive test program defines the "fully discharged" and "fully charged" states of a battery, and validates that the charger will perform as required by NFPA-110. This means that a UL field inspector can with confidence verify that a BBHH charger will indeed meet the recharge requirements of NFPA-110.

Doesn't the battery charger portion of UL 2200 just specify a "UL 1236" battery charger?
Yes it does, and UL 2200 does not specify which *category* of UL 1236 applies. UL has failed to close the loop between these two standards, since UL itself states that only category BBHH is suited for Engine Driven Emergency and Standby Power Systems. The resulting confusion with UL field inspectors causes some of them to reject genset installations for emergency duty if they are not equipped with a BBHH charger. The only way to insure that the local field inspector will pass your installation is to use a BBHH listed charger with the size battery specified on the charger.

Will a BBHH charger meet all the performance requirements of NFPA-110?
Not necessarily. BBHH specifies a single summary alarm relay instead of multiple independent alarms, which is a smaller number of alarms than generally requested by customers wishing to meet NFPA-110. One would think the BBHH unit should have more numerous alarms, but the UL BBHH spec specifies ONE alarm contact.

How do I get a BBHH charger that meets NFPA-110:2002?
Go to UL's web site at the URL below, and insert "BBHH" into the category search field. The search will yield a list of BBHH listed manufacturers and charger models.
http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/ccnsrch.html

Are there any drawbacks of using a BBHH charger?
The charger profile required to achieve fast recharge of a fully depleted battery is aggressive and could, in some cases, be detrimental to the battery. The BBHH charge profile is *not* recommended, for example, for use with VRLA (sealed) lead-acid batteries. The charge profile works well, however, with *well-maintained* flooded batteries.